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Date: 18 April 2001 By: Vladimir Sklíba

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Hui WANG

Serial No.:	Unassigned	Examiner:	Unassigned
Filed:	Herewith	Art Unit:	Unassigned

For: PLATING APPARATUS AND METHOD

Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to examination of the above-identified application, the Examiner is respectfully requested to enter the following amendments.

IN THE SPECIFICATION

Page 1, line 5, please add the following paragraph:

This application is a divisional of U.S. Patent Application Serial No. 09/232,864, filed January 15, 1999, which claims the benefit of U.S. Provisional Application Serial No. 60/094,215, filed July 27, 1998, and U.S. Provisional Application Serial No. 60/074,466, filed February 12, 1998. These cited applications are hereby incorporated, in their entirety, by reference.

IN THE CLAIMS

Please cancel claims 1-109 and add the following new claims:

110. (new) A method for plating a film to a desired thickness on a surface of a substrate, comprising:

plating the film to the desired thickness on a first portion of the substrate surface; and

plating the film to the desired thickness on at least a second portion of the substrate surface to give a film at the desired thickness on the substrate.

111. (new) The method of claim 110, wherein the desired thickness is for a layer of the film on the substrate.

112. (new) The method of claim 111, further comprising:

plating an additional thickness on the layer to give a film of a second uniform thickness greater than the desired thickness of the layer on the substrate.

113. (new) The method of claim 112, wherein the film is plated on the first portion of the substrate by flowing an electrolyte on the first portion of the substrate surface and applying a plating current to plate the film on the first portion of the substrate until the film reaches the desired thickness; repeating the electrolyte flowing and plating current applying for at least the second portion of the substrate to plate the film on the second portion to the desired thickness; and flowing an electrolyte to the first portion and the second portion of the substrate and applying plating current to at least the second portion until the second uniform thickness is obtained.

114. (new) The method of claim 113, wherein the film is plated on the first and second portions of the substrate by independently providing the plating current to plating electrodes for the first and second portions.

115. (new) The method of claim 114, wherein the electrolyte is independently flowed to the first and second portions of the substrate.

116. (new) The method of claim 110, wherein the film is plated on the first and the second portion of the substrate by flowing an electrolyte on the first and the second portion of the substrate simultaneously, and applying plating current to plating electrodes for the first and second portions separately.

117. (new) The method of claim 116, further comprising providing said plating current to the first portion of the substrate to prevent deplating after the film reaches the desired thickness on the first portion of the substrate while applying said plating current to the second portion of the substrate.

118. (new) The method of claim 116, further comprising providing plating voltage to the second portion of the substrate to prevent deplating while applying said plating current to the first portion of the substrate.

119. (new) The method of claim 116, further comprising moving the first portion of the substrate out of the electrolyte after the film reaches the desired thickness on the first portion of the substrate while applying the plating current to the second portion of the substrate.

120. (new) The method of claim 110, wherein said film is plated on the first portion and the second portion of the substrate by flowing an electrolyte on the first portion of the substrate while plating the film on the first portion of the substrate; and by flowing electrolyte to the first portion and second portion of the substrate simultaneously, while plating the film on the second portion of the substrate.

121. (new) The method of claim 120, further comprising providing a plating voltage to the first portion of the substrate to prevent deplating after the film reaches the

desired thickness on the first portion of the substrate while applying the plating current to the second portion of the substrate.

122. (new) The method of claim 110, wherein said film is plated on the first and the second portion of the substrate by flowing an electrolyte on the first portion of the substrate by moving a movable jet anode proximate the first portion of substrate; and by flowing an electrolyte on the second portion of the substrate by moving a movable jet anode proximate the second portion of the substrate.

123. (new) The method of claim 110, further comprising immersing the substrate surface into an electrolyte, and plating the film on the first portion and the second portion of the substrate by separately moving a movable jet anode proximate the first portion of substrate and moving a movable jet anode proximate the second portion of the substrate.

124. (new) The method of claim 110, wherein the film is plated on the first portion of the substrate while the film is plated on the second portion of the substrate.

125. (new) The method of claim 124, wherein the film is plated on the first portion and the second portion of the substrate by flowing an electrolyte on the first portion of the substrate while plating the film on the first portion of the substrate, and by flowing electrolyte to the first portion and second portion of the substrate simultaneously while plating the film on the first portion and the second portion of the substrate simultaneously.

126. (new) The method of claim 125, wherein the film is plated on the first portion and second portion of the substrate to the desired thickness to give a layer, further comprising:

plating an additional thickness on the layer to give a film of a second uniform thickness greater than the desired thickness of the layer on the substrate.

127. (new) The method of claim 110, wherein the film is plated on the first portion and the second portion of the substrate by flowing an electrolyte on the first portion

of the substrate while plating the film on the first portion of the substrate, and by flowing an electrolyte to the first and second portion of the substrate simultaneously while plating the film on the second portion of the substrate.

128. (new) The method of claim 127, further comprising providing a plating voltage to the first portion of the substrate to prevent deplating after the film reaches the desired thickness on the first portion of the substrate while applying a plating current to the second portion of substrate.

129. (new) The method of claim 128, wherein the film is plated on the first portion and second portion of the substrate to the desired thickness to give a layer, further comprising:

plating an additional thickness on the layer to give a film of a second uniform thickness grater than the desired thickness of the layer on the substrate.

130. (new) The method of claim 110, wherein the second portion of the substrate is adjacent to the first portion of the substrate.

131. (new) The method of claim 110, wherein the substrate is a semiconductor wafer.

132. (new) The method of claim 131, wherein the semiconductor wafer is a silicon wafer.

133. (new) The method of claim 132, wherein the silicon wafer includes a barrier layer on its top.

134. (new) The method of claim 133, wherein the barrier layer is one of titanium, titanium nitride, tantalum or tantalum nitride.

135. (new) The method of claim 133, wherein the semiconductor wafer further includes a seed layer on top of the barrier layer.

136. (new) The method of claim 135, the seed layer being thicker proximate a peripheral portion and thinner at an inner portion of the semiconductor wafer.

137. (new) The method of claim 131, wherein the film comprises interconnects in integrated circuits on the semiconductor wafer.

138. (new) The method of claim 137, wherein the interconnects are in a damascene structure.

REMARKS

The present application is a divisional of U.S. Patent Application Serial No. 09/232,864, filed January 15, 1999, which claims the benefit of U.S. Provisional Application Serial No. 60/094,215, filed July 27, 1998, and U.S. Provisional Application Serial No. 60/074,466, filed February 12, 1998.

The specification has been amended to include a specific reference to the above-identified applications for which a claim of priority is made.

Claims 1-109 have been cancelled, and new claims 110-138 have been added. New claims 110-138 correspond to non-elected Group I claims of the parent application, U.S. Patent Application Serial No. 09/232,864.

These amendments do not add any new matter, and the Examiner is respectfully requested to enter them. Further consideration of the present application is respectfully requested.

If in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned at (650) 843-5622.

Respectfully submitted,
COOLEY GODWARD LLP

Date: 4-17-01

By: ______________________________

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